memnon and *Sarpedon* (and probably *Brathycles*), which feed on cinnamon and sour-sop: the chrysalis is smooth, the head bluntly bifurcate, the thorax prolonged into a point and the back nearly straight; whereas all the others are more or less bent into an angle: they differ also in position, being suspended to the undersides of *leaves* with the head *downwards*, whereas all the others are attached to the *stems* of plants with the head *upwards*.

I cannot at this moment call to mind what the larvæ are like; it is several years since I saw and drew them (with many others), and my wife painted them. They are, or were, in the British Museum, placed there by Dr. Templeton; you can refer and see, if you wish to follow this up.

Lastly, *P. dissimilis* carries its name with it into the chrysalis state: it is unlike any other, being indeed *sui generis*: it precisely resembles a piece of burnt stick, very elongated and ending abruptly as it were; head hardly bifurcate; thorax distinctly so.

Papilio Antipathes has only been captured once to my knowledge in the island, I therefore know nothing of its transformations. Besides this one which is in my collection, I saw two specimens only, and those on the road between Ambegammoa and Yatteantotte in the hills.

BIBLIOGRAPHICAL NOTICES.

Principles of the Anatomy and Physiology of the Vegetable Cell. By Hugo von Mohl. Translated by Arthur Henfrey, F.R.S. &c. Van Voorst, 1852.

Somewhat late in the day perhaps, but still we hope not too late, we call the attention of our readers to the above most valuable contribution to the science of vegetable physiology. There are others who have made more noise in the world, but perhaps no continental botanist has contributed so much, by careful, painstaking, and conscientious research to the development of his subject, and there is certainly none whose voice deserves to be more attentively listened to than Hugo von Mohl;—a man of facts, whose theories have been his humble and useful servants, not his masters. It is hardly necessary for us to point out in addition, that Mr. Henfrey's name, as the translator, not only secures the fidelity of interpretation of Von Mohl's ideas, but is sufficient assurance that the doctrine of the vegetable cell is here at the level of the present state of knowledge.

As an admirable exposition of that doctrine, we cordially recommend it to the English reader, and regarding it in that point of view, there are one or two matters on which we shall venture to offer a few words of criticism.

The first of these is the very common notion which prevails, we might say among all botanists (with the exception of Von Mohl), with regard to the respective *activities* of the two great morphological elements of the vegetable cell,—the cellulose membrane, and the nitrogenous primordial utricle.

Alex. Braun, one of the most profound of modern vegetable physiologists, says, "From the contents (*i. e.* the primordial utricle with its contents) all the vital activity of the cell proceeds; the membrane is an externally deposited structure, a product of secretion, which takes only a passive share in the vital actions, as the medium of exchange between the interior and the exterior, at the same time separating and uniting the neighbouring cells, and affording defence and solidity to the separate cell in connexion with the whole tissue . . . . Thus the life of the plant weaves in the cell-membrane its own shroud, and dies at last in the dwelling it has constructed for itself." (Ueber Verjungung, p. 166.)

Schacht (Die Pflanzen-Zelle) as decidedly advocates the same view, and so far as we know, it is that adopted in all the ordinary text-books; in these we universally find it assumed or stated, that the cellulose membrane of the cell is a passive element excreted and formed by the primordial utricle, and possessing no powers independent of it.

Von Mohl, however, speaks far more cautiously on this head; in his present work, p. 36, we find:—

"In all young cells, whatever their subsequent contents may be, whether they persist in the stage of cells or become changed into vascular utricles, a series of formations are met with, which disappear again more or less perfectly in the subsequent periods of life, and which stand in the closest relation to the origin and growth of the young cell, but only in particular cases in relation to their later functions . . . . The primordial utricle disappears again with the thickening of the vessels, the cells of the wood of the pith of the inner part of the petiole, and of thick leaves" (p. 36–37). And the fact of the early disappearance of the primordial utricle in many cases was equally pointed out in his earlier work, "Remarks on the Structure of the Vegetable Cell," 1844 (Taylor's Scientific Memoirs, iv. 91). Now a slight consideration must we think render it evident, that if it be true that the primordial utricle disappears with the thickening of the cellulose membrane, the latter continuing to grow subsequently to its disappearance, it cannot be that the primordial utricle is the sole active agent in the growth of the plant; the cellulose membrane must have its power of growth and independent activity also.

That such is indeed the case is we think evidenced in the most clear and striking manner by the development of the peculiar spirally thickened and perforated cells in the leaf of *Sphagnum*, which is so well described by Schacht (*l. c.* 66–67), whose observations (the full bearing of which he does not seem to see) we have taken occasion to verify in every particular. We have no space to enter into details in this place, but we may shortly state that certain cells, at first perfectly resembling the rest of those which constitute the base of the leaf of *Sphagnum*, enlarge disproportionately, and gradually lose every trace of contents and primordial utricle. Iodine, sulphuric acid and sugar, and other reagents which yield abundant evidence of the primordial utricle in the surrounding cells, fail to pro-

duce the slightest characteristic reaction in these. But tracing these enlarged cells in their course towards the point of the leaf, we find that, first, a very considerable spiral or annular thickening band is developed from their ovules ; and secondly, that these walls become perforated in particular localities, showing clearly that the cellulose wall is in itself abundantly competent to perform the vital actions of assimilation and absorption, or rather resolution, without the assistance of the primordial utricle.

Nor let it be said, that here the thickenings and resolutions are determined by the primordial utricles of adjacent cells, for the *Sphagnum* leaf, as is well known, consists of only a single layer of cells joined side by side, and the thickening takes place as much on the upper and lower surfaces as on the sides of the spiral cells, while the perforations are formed exclusively upon the upper and lower surfaces. Surely here nature furnishes us with a crucial instance of the independent vitality and powers of action of the cellulose cell-wall, whence important conclusions may be drawn for the whole vegetable kingdom.

There is yet another error which we venture to submit pervades the whole of vegetable no less than animal physiology,—we refer to the notion that animals and plants are formed by the coalescence of their histological elements—the cells. It is said that plants are formed by means of cells which have "*grown together*" (Von Mohl, p. 30), having "arisen separately as development teaches" (Schacht, p. 75) ; and this conception of the individuality of the separate plant-cells, though by giving distinctness to the ideas of investigators it has served a good purpose, seems to us to be at present essentially obstructive.

If in fact we turn from this convenient mode of viewing the facts to the facts themselves as they really are, we find that the cells which compose any vegetable tissue never have been independent, and that therefore it is as absurd to talk of their coalescence, as to say that a man is formed by the coalescence of his head, trunk and limbs.

Indeed, all the knowledge we have hitherto obtained of development, whether morphological or histological, uniformly bears testimony to the truth, that the great law established by Von Bär for the animal world holds good as universally in that of plants. They and all their organs, and all the histological elements of these organs, are produced, *not by the coalescence of the heterogeneous, but by the differentiation of the homogeneous parts*, and it would be more true to say that the plant is formed by the separation of cells than that it arises from their coalescence. This however is a most important subject, and one which we hope to follow out elsewhere.

Handbuch der Conchyliologie und Malacozoologie.
Von Dr. R. A. Philippi. Halle, 1853. 8vo, pp. 548.

By the preface we are informed that this work was written on board the Hamburg brig Bonito, and dated while it was passing Cape Horn, the author having, by the late political disturbances in